Siberian rivers make no deposit, either in winter or summer, which could cover in a mammoth. Nor are the mammoths chiefly found near rivers, but on high ground out of the reach of rivers. When they occur near the rivers, it is generally on the head streams, which could not float such carcasses.

Surely, in criticizing my view of a problem which has been the crux of almost every serious student since the days of Cuvier, your critic might have noticed these now elementary facts. It is not fair to me or to your readers to deal with this difficult question as if it could be settled by a casual reference to causes long ago discarded by such authorities as Brandt and Baer, Schmidt and Schrenck.

I am anxious beyond measure to meet with some criticism that I can reply to, and shall not shrink from the issue being tried by the severest tests.

What I complain of, and others more important than myself share my opinion, is that the only answer forthcoming from uniformitarians to test cases like the one above referred to is, ostrich-like, to put their heads in the sand and to cry out, "Since we are committed to Lyell's theory, it is useless to quote facts against us." This may have done in the fifteenth century, but it will not do now when so many critics are abroad.

May I presume to invite a discussion in your paper on this most interesting question? I cannot forget that it was in your pages I first raised it many years ago.

Bentcliffe, Eccles, December 10. HENRY H. HOWORTH.

IN regard to the first part of Mr. Howorth's letter, I must remind him that it was admitted in my review that such a being as an irrational uniformitarian did exist, and was duly smitten in his book.

In regard to the occurrence of mammoth carcasses (not skeletons), I wrote of ice with some hesitation, knowing alleged cases to be open to question, but I mentioned it, because, in my opinion, it would be the most difficult to explain, and the strongest case in favour of Mr. Howorth. Where the carcass is preserved in clay or gravel the difficulty is less. All that seems needed is a flood of rather exceptional character, carrying the dead beast rather far north; then, if this happened at the right season of the year, the body might be buried by other floods before decomposition set in (the temperatures might be always low, though sometimes above 32° F.), and so the body might escape unrotted, until it was finally well entombed. My position was that, though this explanation of the escape of a carcass from destruction, under circumstances not very different from the present, was not easy, the explanation of such a series of catastrophes as Mr. Howorth demanded was much harder. The grounds of this opinion cannot of course be stated in the limits of a letter, nor can I discuss *seriatim* the cases which he cites. So far as my memory serves me (I am writing at a distance from any scientific library) they are not so universally favourable to his view as is stated in his letter.

The remainder of Mr. Howorth's letter is open to the charge which he brings against the review, of being merely rhetorical. *Quis tulerit Gracchos de seditione querentes?*

YOUR REVIEWER.

Centre of Water Pressure.

THE following extremely simple construction for the centre of pressure of a homogeneous liquid on a triangular area occupying any position whatever in the liquid has not (I learn from a high authority on hydrodynamics) been hitherto known, and it may be interesting to some of the readers of NATURE.

Let a particle be imagined to be placed at each vertex of the triangle, its mass being proportional to the depth of this vertex from the surface of the liquid; let G' be the centre of gravity of these particles, and let G be the "centre of gravity" of the triangular area. Then P, the centre of pressure, lies on the line GG' at a distance $\frac{1}{4}GG'$ from G.

There is another almost equally simple way of expressing this result; and of course it is known that there are other ways, more or less practically unmanageable, of representing the position of this point, P, by means of momental ellipses, &c.

GEORGE M. MINCHIN.

R.I.E. College, Cooper's Hill, December 15.

The Recent Earthquakes in Iceland.

ON October 28 last, at 20 minutes past 5 in the morning, two earthquakes occurred at Reykjavík, and reports were soon received as to earthquakes in other districts, especially at Cape Reykjanes. The whole peninsula of Reykjanes is covered with lava streams, and there are many craters and fissures. The extreme point of this peninsula seems in former times to have been the scene of many volcanic eruptions. Tradition tells that long ago the promontory stretched eight miles further to south-west than it does now, and that great earthquakes and volcanic eruptions in the years 1389–90 produced the subsidence of the ancient promontory. The land reached then to Eldey (the Fire Island), or, as the Danes call it, "Melsækken." In historic times ten volcanic eruptions are known to have taken place in the neighbourhood of these rocks.

During the night between October 27 and 28 more than forty shocks were felt at the lighthouse of Cape Reykjanes, nine of the lamps were broken, and the house where the lighthouse keeper lives and a warehouse were damaged. A fissure from south-west to north-east was formed in the rocks 2 yards from the lighthouse; the rocks beneath were cracked in several places, and these cracks go in the same direction as the old fissures associated with volcanic cones. At Eyrarbakki the earthquake was observed at 25 minutes past 5, and proceeded from north-north-west to south-south-east. To north-west the earthquake was felt in Borgar fjord, and as far to the south-east as to Eyjafjöll. This shock was therefore felt over an area of more than 4500 square miles.

A less violent earthquake was felt here in Reykjavík on November 13, at 35 minutes past 9 p.m.

In the year 1882 I published in an Icelandic review, *Andvari*, a list of questions concerning earthquakes, nearly the same as were published in 1880 by Prof. A. Heim for the Earthquake Commission in Switzerland. A similar list of questions has now been printed in the Icelandic newspapers. The questions will also be printed separately, and sent to Icelandic clergymen and others who probably take interest in this subject.

Reykjavik, November 30. TH. THORODDSEN.

The Canary Islands.

NOW that the Canary Islands are rapidly becoming better known as one of the most advantageous health-resorts within easy reach of England, it may be of some interest to mention a few facts concerning diseases in the Archipelago.

The one pre-eminent fact is that the climate seems to modify the virulence of the worst, the most dangerous diseases. Puerperal fever, though rather prevalent, is seldom, I may almost say never, fatal, though I know of cases where the patient has been neglected for several days before medical advice was obtained. Diphtheria is also very prevalent in the large towns, owing to the total absence of the most ordinary sanitary precautions, but it seems always to exist in a mild form. I know of certain families who apparently have it frequently, but this terrible disease seems to be only fatal where the most elementary knowledge of nursing is absent.

Fevers of all kinds are lighter in character. The treatment recommended there by the profession is different from that in vogue in England. For example, it starts by a thorough clearing out of the system by means of somewhat violent purgatives and emetics.

Equable as is the climate by day and night, the natives suffer most from chills, which often end fatally. This, I think, may be in a great measure accounted for by the absence of woollen or silken clothing. Those who visit the Canaries from colder northern latitudes where wool is worn next the skin, and who most wisely continue this habit, do not suffer in this way. It is advisable that every article of clothing worn in the islands be either made of wool or silk. Thus armed, one is almost impregnable to the attacks of any disease of a catarrhal nature. Malaria does not exist. Precautions as to hours of recreation, such as keeping in the house at sundown, are in these islands unnecessary, and one may be out on the hottest day at the hottest hour without fear of sunstroke.

The only disease which in any way can be said to be peculiar to, or prevalent in, the Canary Islands is elephantiasis, which, as your readers well know, does not affect well-nourished inhabitants, and is neither contagious nor infectious.

In Gran Canaria diseases of the stomach and intestines are

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common among the peasants. Such are clearly traceable to the national food, *gofio*, which in this island is made of Indian corn.

For phthisis the Canary Islands have been proved of inestimable value, and therefore on this point nothing more need be said. The temperature throughout the year, by day and by night, varies exceedingly little. In my recently-published work on these islands I have gone so fully into this question that I need not recapitulate it here.

I should not have thus ventured to trouble you had I not been asked by some leading members of the medical profession to summarize the facts, bearing upon diseases, scattered through the pages of my book and to add thereto others which I had deemed unsuitable for the general reader. Olivia M. Stone.

11 Sheffield Gardens, Kensington, W., December 14.

The Ffynnon Beuno and Cae Gwyn Caves.

Mr. Smith has entirely failed to substantiate the statement made by him in his letter of December 1 (p. 105) concerning the drift over the entrance of the Cae Gwyn Cave, which is 20 feet in thickness and full of ice-scratched boulders, many of large size; therefore I need only say in reply that the Geological Surveyors who surveyed this district have examined the section and have had no hesitation whatever in classifying the deposits in the section with the Glacial beds of the area. In regard to the age of river drift implements as compared with those found in the cavern, which are identical with the implements found in Kent's cavern and the French caves, I need only quote the remarks of M. Lartet ("Reliquiæ Aquitanicæ," p. 9):—"If some are inclined to attribute to the works of human industry found in the 'Diluvium' or 'Drift' a date more ancient than to those occurring in caves with a similar association of animal remains, we are obliged to remark that such a proposition, expressed as a systematic generalization, is not justifiable in any point of view." . . . "Caves were in truth the first shelter which primitive man would choose, whether driven by instinct or determined by reason."

When Mr. Smith calls the implements found in the gravels at Mildenhall, Neolithic, which others claim to be Palæolithic, and one most eminent authority to be pre-Glacial, I am perfectly justified in saying that the classification of such implements, as defined by Mr. Smith, has no chronological value, and therefore I do not think that anyone is likely to be convinced by his arguments when he is "content to resist the idea of the pre-Glacial age of these caves on purely archæological grounds."

Henry Hicks.

Hendon, December 23.

Distorted Earth Shadows in Eclipses.

With reference to the peculiar appearance of the earth's shadow in the lunar eclipse of August 3 of this year, and noted by "H. H." and "M. C." (see Nature, vol. xxxvi. pp. 367 and 413), it may be of interest to record a similar distortion observed by Capt. A. E. Barlow, on the s.s. *Nizam*, at Suez, on August 23, 1877. The following entry appears in his meteorological log:—

"The eclipse of August 23. The moon as seen at midnight at Suez. Weather fine starlight. A few cir.-c. (amount 3) travelling from northward."

The shadow was irregular and jagged as in "M.C.'s" description.

Henry Toynbee,
Marine Superintendent.

Meteorological Office, December 22.

DR. BALFOUR STEWART, F.R.S.

In the genial Manchester Professor the scientific world has lost not only an excellent teacher of physics but one of its ablest and most original investigators. He was trained according to the best methods of the last generation of experimentalists, in which scrupulous accuracy was constantly associated with genuine scientific honesty. Men such as he was are never numerous; but they are the true leaders of scientific progress:—*directly*, by their own contributions; *indirectly*, though (with rare exceptions) even more substantially, by handing on to their students the choicest traditions of a past age, mellowed by time and enriched from the experience of the present. The name of Stewart will long be remembered for more than one striking addition to our knowledge, but his patient and reverent spirit will continue to impress for good the minds and the work of all who have come under its influence.

He was born in Edinburgh, on November 1, 1828, so that he had entered his sixtieth year. He studied for a short time in each of the Universities of St. Andrews and Edinburgh, and began practical life in a mercantile office. In the course of a business voyage to Australia his particular taste for physical science developed itself, and his first published papers:—"On the adaptation of the eye to different rays," and "On the influence of gravity on the physical condition of the Moon's surface":—appeared in the *Transactions of the Physical Society of Victoria* in 1855. On his return he gave up business for science, and resumed study under Kelland and Forbes, to the latter of whom he soon became Assistant. In this capacity he had much to do with the teaching of Natural Philosophy on occasions when Forbes was temporarily disabled by his broken health. During this period, in 1858, Stewart was led to his well-known extension of Prévost's *Law of Exchanges*, a most remarkable and important contribution to the theory of Radiation. He seems to have been the first even to suggest, from a scientific stand-point, that radiation is not a mere surface phenomenon. With the aid of Forbes' apparatus, then perhaps unequalled in any British University, he fully demonstrated the truth of the conclusions to which he had been led by theory; and the award of the Rumford Medal by the Royal Society, some years later, showed that his work had been estimated at its true value, at least in the scientific world. In fact his proof of the necessary equality between the radiating and the absorbing powers of every substance (when divested of some of the unnecessary excrescences which often mask the real merit of the earlier writings of a young author) remains to this day the simplest, and therefore the most convincing, that has yet been given.

Radiant Heat was, justly, one of Professor Forbes' pet subjects, and was therefore brought very prominently before his Assistant. Another was Meteorology, and to this Stewart devoted himself with such enthusiasm and success that in 1859 he was appointed Director of the Kew Observatory. How, for eleven years, he there maintained and improved upon the memorable labours of Ronalds and Welsh needs only to be mentioned here:—it will be found in detail in the *Reports of the British Association*. Every species of inquiry which had to be carried out at Kew:—whether it consisted in the testing of Thermometers, Sextants, Pendulums, Aneroids, or Dipping-Needles, the recording of Atmospheric Electricity, the determination of the Freezing-Point of Mercury or the Melting-Point of Paraffin, or the careful study of the peculiarities of the Air-Thermometer:—received the benefit of his valuable suggestions and was carried out with his scrupulous accuracy.

About twenty years ago Stewart met with a frightful railway accident, from the effects of which he did not fully recover. He was permanently lamed, and sustained severe injury to his constitution. From the vigorous activity of the prime of life he passed, in a few months, to grey-headed old age. But his characteristic patience was unruffled, and his intellect unimpaired.

His career as Professor of Physics in the Owens College has been, since his appointment in 1870, brilliantly successful. It has led to the production of an excellent treatise on *Practical Physics*, in which every necessary detail is given with masterly precision, and which contains (what is even more valuable, and could only have been secured to the world by such a publication) the matured convictions of a thorough experimenter as to

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